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COLEMANITE PSEUDOMORPHOUS AFTER INYOITE FROM DEATH VALLEY, CALIFORNIA

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The frontispiece of this number is a photograph of an interesting specimen presented to the geology department of Stanford University by the late Mr. C. A. Waring of the California State Mining Bureau. This, and a similar specimen in the department museum collected by Mr. H. P. Knight, are from the Biddy McCarty mine of the Pacific Coast Borax Company in Death Valley, Inyo County, California. The specimen shown in the photograph was labeled in the field "colemanite after calcite," while the other specimen was labeled "rare form of calcium borate."

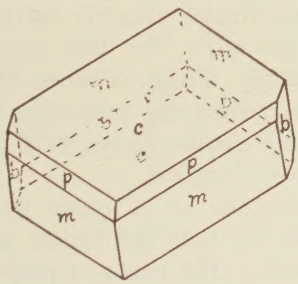

FIG. 1. Form of original inyoite.

CRYSTAL FORM

The material of both specimens proves to be colemanite, but the original mineral was inyoite, a hydrous calcium borate recently described by Schaller[1] from the same region. The crystals, on close examination, prove to be monoclinic instead of hexagonal as at first supposed. The forms present are: *c* (001), *m* (1̄10), *b* (010), and *p* (111). The habit is tabular parallel to *c* (001) as represented in Fig. 1. The following inter-

[1] *U. S. Geol. Survey, Bull.* 610, 37, 1916.

facial angles, (each the average of ten values with the limits stated) were measured with a contact goniometer:

Angle	Limits	Average	Schaller's Value
$m : m$ $(110 : 1\bar{1}0)$	$77\frac{2}{3}°–79\frac{1}{2}°$	78° 21′	79° 45′
$m : c$ $(110 : 001)$	71 –72	71 36	69 20
$b : c$ $(010 : 001)$	$88\frac{2}{3}$ –$90\frac{1}{2}$	89 34	90 0
$a : c$ (edge $110/1\bar{1}0 : 001$)	$63\frac{1}{3}$ –$65\frac{5}{6}$	64 31	62 37
$m : p$ $(110 : 111)$	37 –39	37 57	36 15
$c : p$ $(001 : 111)$	$32\frac{2}{3}$ –35	33 54	33 5

These measurements clearly prove that the form is that of inyoite, but it is believed that the average angles given are closer to the truth than those given by Schaller, in spite of the fact that the crystals are pseudomorphs. The crystals are very sharp and well defined, and the faces for the most part are fairly smooth.

Graphic Determination of Geometrical Constants of Inyoite

The measured angles will furnish on calculation the geometric constants to the fourth or fifth decimal place, but as the angles are only approximate, a better method is to determine these constants graphically. For this purpose the gnomonic projection is well suited. Figure 2 shows the procedure. The Penfield sheets for stereographic projection may be employed, as scale No. 2 of these sheets (shown at the bottom of Fig. 2) gives directly tangents of angles.

The projection is made on a plane perpendicular to the [100 : 110 : 010] zone, so that the center of the circle is the projection of the *c*-axis. The *b*-axis is projected along the line *Bz* and the *a*-axis (foreshortened) along the line *Az*. The pinacoid *b* (010) is projected at infinity in the direction of the radius *zB*. One-half the $(110 : 1\bar{1}0)$ angle is laid off on the divided circle to the right. The point *V* is thus established. The unit prism *m* is projected at infinity. It is indicated by drawing a radius thru *V*. Next the point *c* (projection of 001) is located by plotting the tangent of the complement of the angle, 64° 31′ (β) from *z* along the zone line *Az*. Thru *c* the zone line *Mcp* is drawn parallel to *zV*. This line contains the point *p*, not yet located. Angles along a zone line may be plotted by finding what is called the *angle point of the zone.*

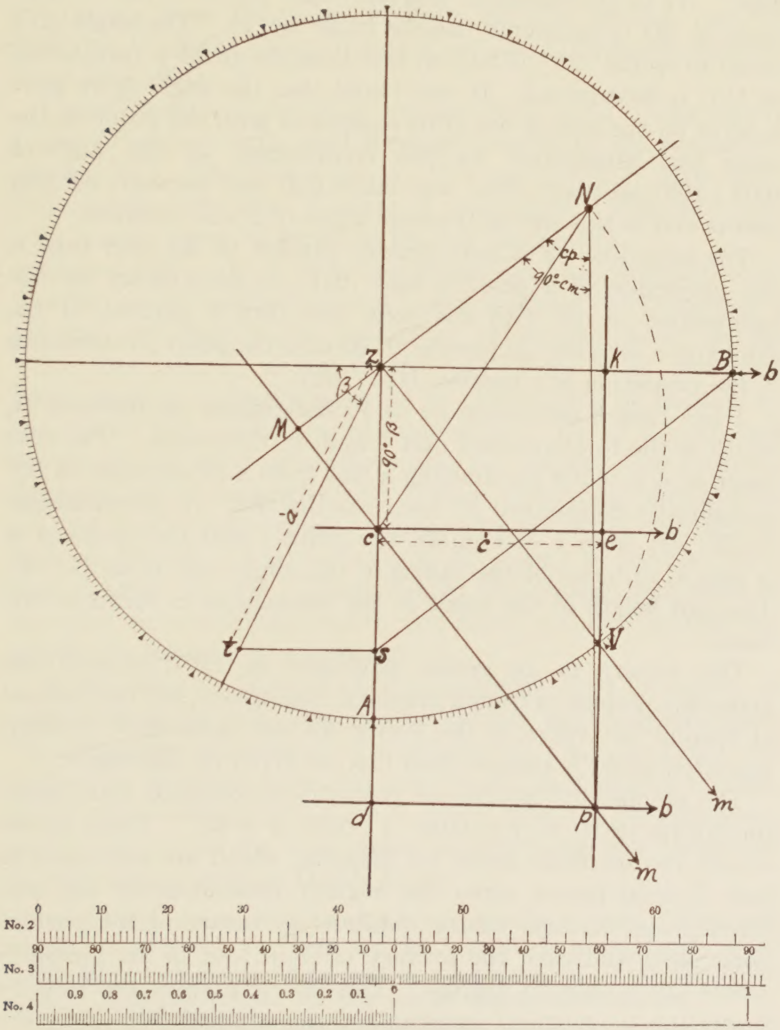

FIG. 2. Graphic determination of constants of inyoite.

With radius *MV* and center at *M* an arc of a circle is drawn, which cuts the line thru *M* and *z* at *N*, the angle point of the zone. *Nz* in stereographic degrees (scale No. 3) is the complement of *Mz* in gnomonic degrees (scale no. 2). The angle *cNp* equal to *cp* (33° 54′) is laid off and thus the point *p* (projection of 111) is determined. It was found that the angle *MNc* gave a point on the line *zd* not quite coincident with the point on the same line established by the complement of the angle β (001 : 100), so that *c* (001) was taken half way between the two points and in this way an average value of β was obtained.

The zone line *pk* is next drawn, parallel to *Az*, and thus *e*, the projection of a possible face (011), is determined by the intersection of *pk* with the zone line thru *c* parallel to *Bz*. Similarly a zone line *pd* parallel to *Bz* thru the point *p* establishes *d*, the projection of a possible face (101).

A line thru *B* perpendicular to *Vz* determines the distance *zs*, which is the foreshortened unit length of the *a*-axis. The true value of *a* is found by drawing a line from *z* at an angle of 65° (graphically determined β) from the line *Bz*. A perpendicular to the left from *s* determines the point *t* and the distance *zt* is axis $\grave{a}$, in terms of the radius of the circle (use scale No. 4). The unit length of the *c*-axis is the distance *ce* in terms of the radius.

The writer,[2] in an article published in 1907, treated the gnomonic projection from a graphical standpoint, but the method of finding the value of the $\grave{a}$-axis (in the monoclinic system) indicated above is simpler than the one given in that paper.

The graphically determined geometrical constants thus found for inyoite are $\grave{a} : b : \dot{c} = 0.90 : 1 : 0.63$; $\beta = 65°$. These values should replace those given by Schaller, which are expressed in four decimal places, altho the angular measurements are confessedly approximate values, obtained by means of the contact goniometer and each the average of from four to six measurements given only to degrees. This use of graphic methods to determine geometrical constants from approximate measurements has not to my knowledge been emphasized before.

Identification of Pseudomorphous Mineral

Chemical Tests. The mineral now constituting the specimens in question gives qualitative tests for the borate radical and for

[2] *School Mines Quart.*, **29**, 24–33, 1907.

calcium.[3] It is soluble in hydrochloric acid with the separation of boric acid. The mineral also gives water when heated in the closed tube. These chemical tests, however, do not differentiate colemanite from the other hydrous calcium borates: meyerhofferite, $Ca_2B_6O_{11}.7H_2O$, inyoite, $Ca_2B_6O_{11}.13H_2O$, and priceite,[4] $Ca_5B_{12}O_{23}.9H_2O$.

Crystal Form.—A few small crystals were found. They prove to be monoclinic with good cleavage parallel to the symmetry-plane (010). The forms are *m* (110) and *y* ($\bar{1}11$), with interfacial angles very close to those of colemanite. This habit, tho very simple, seems to be a new one for this mineral.

Optical Tests.—Now, even the crystal form and chemical composition taken together are not always sufficient to determine a mineral, for there is the possibility of paramorphism[5] as the writer has recently shown in the case of the silica minerals.[6] Some physical property needs to be determined, in addition to the crystal form and chemical composition. Of all the physical properties, the most satisfactory ones for minerals that transmit light are optical properties, and of these the indices of refraction are the most fundamental. Crushed fragments of the mineral have the following indices of refraction:[7] $n_1(n_\gamma) = 1.615 \pm 0.001$, $n_2n_\beta = 1.595 \pm 0.001$. These indices are greater than those of the other three calcium borates, and prove conclusively that the mineral in question is colemanite.

Alteration of Inyoite to Colemanite.—The formation of colemanite at the expense of inyoite involves merely dehydration. The alteration of inyoite to meyerhofferite, $Ca_2B_6O_{11}.7H_2O$, described by Schaller[8] from the same region is a similar change. Of the three hydrates of $Ca_2B_6O_{11}$, colemanite, the pentahydrate, seems likely to be the most stable under atmospheric conditions in arid regions, such as Death Valley.

[3] As calcium is precipitated when the acid solution is made alkaline with ammonium hydroxid, the best test for calcium is to precipitate it as $CaSO_4.2H_2O$ with dilute sulfuric acid in the presence of 50 per cent. ethyl alcohol. This also furnishes the best test for calcium in phosphates.

[4] Larsen (*Am. Min.* 2, 1, 1917) has shown that priceite is a distinct mineral.

[5] A paramorph is a pseudomorph of one polymorphous form of a substance after another. Polymorphism seems to be a general phenomenon of nature.

[6] Silica in the form of tridymite from Tuolumne County, California, proved to be cristobalite paramorphs after tridymite. *Am. J. Sci.* [4], 45, 222, 1918.

[7] The fragments are cleavage plates parallel to (010), so that the minimum value of the index of refraction (n_α) is not obtained.

[8] *Place cited.*

A MINERALOGICAL TRIP IN FRANCE

ALFRED C. LANE

Tufts College

When I was ordered to Beaune and was placed in charge of teaching the mineralogy there, in the American Expeditionary Forces University, there were no minerals and no text-books available for the class. Some "Lefax" folders (9–22 and 9–48) arrived by first-class mail before we finished, however; and owing to the kindness of M. A. Changarnier, Officer of Public Instruction and Conservator of the fine Museum at Beaune, and of Prof. J. Blagac, of the University of Dijon, who presented and loaned to us an extensive series of minerals, including some fine specimens, we were able to get along. I also obtained a set from Stuer of Paris, who is to France what English of Rochester is to this country, before we left. Practically no government requisitions came thru in the brief three months of the existence of the Beaune university. There was therefore a fine chance to illustrate makeshifts, such as a blowpipe made of two clay pipes; a lens used as a burning glass to test fusibility; broken porcelain electric fixtures as streak plates; etc. But great emphasis was naturally laid on physical characters, and especially the associations, *i.e.*, the paragenesis of the minerals. By using specimens that had several minerals on them, we did not need to borrow so many; and as every mineralogist knows, the association of a mineral as for instance staurolite with metamorphic rocks, is a thoroly reliable means of identifying it. We were located near enough to five different kinds of mines to reach them on our excursions. Beaune, located on the edge of the Jurassic limestones, and of the deposits of a Pliocene lake, and within a few miles of both the coal measures and the granites of the Morvan district, was not a bad place for our work.

Perhaps the most interesting excursion, and one which I can recommend to any mineralogist who finds himself in that neighborhood, is to the fluorite mine of La Petite Verrière, owned by the Mayor, M. P. de Champeaux, who was extremely courteous to us. This mine is within sight of the tramroad running from Autun to Chateau-Chinon, 12½ kilometers northwest of Autun (lat. 47° N., long. 4° 15′ E.). The dumps of this mine are so brilliant they might almost be considered fluorescent, and are

the prettiest I have ever seen, a most beautiful pink, and white with a green hue. The vein occurs in a granite porphyry, and strikes N.N.E., dipping at 66° E.

The normal color of the fluorite in the vein is very light, pure green. Next to it, in order of age, is a white chalcedonic silica› in narrow seams, almost like Arkansas novaculite in appearance. This fluorite, which forms the bulk of the vein, is cut by obviously later veins of fluorite, more of a sea green in color, with a slightly violet hue. Truly violet fluorite is rare, and I am inclined to think is the result of secondary changes, perhaps corresponding to that which takes place when greenish glass is colored violet by exposure to the sun. Crystals are infrequent, but I found a few cubes. The later veins are also often bordered by chalcedony.

Next in order of age comes barite, which is of white or flesh color, and occurs at the combs of the secondary veins in tabular forms such as are common with this mineral, grouped together in such a manner as to suggest the carved wooden fur on certain Noah's Ark animals of my boyhood days. The barite crystals were sometimes covered by small quartz crystals, and occasionally by larger ones. A few specimens showed quartz of a beautiful golden hue, due to a film of limonite, the last mineral deposited. The barite is deleterious to the use to which this fluorite is put—the making of steel at the famous Schneider's works at Le Creusot, not far away—so it is picked out, and there are quantities of it, including fair crystals, on the dump.

In the rather brief visit we were able to make no particularly rare minerals were found, but we took some fine large pieces of the usual ones, above described, and it is hoped that they will ultimately reach the U. S. National Museum. The whole deposit was strikingly and remarkably free from sulfide minerals, which was of course an important consideration in connection with its use in steel manufacture. The deposit is a good illustration of the association of fluorite with granitic rocks, and some interesting mineral associations might be found by someone who could spend a longer time there.

After the term I visited the Auvergne, with its wealth of zeolite minerals. Here Clermont-Ferrand is the best headquarters, there being at hand a University, and the Professor of Geology there, M. Ph. Glangeaud, has written both an exhaustive monograph and a pamphlet guide upon the region. The University collections are well worth a visit, as is also that of the mineral dealer, M. Demarty.

WILLIAM EARL HIDDEN

GEORGE F. KUNZ

New York City

(*Continued from page 129*)

Besides being instrumental in the determination of "hiddenite," Hidden discovered another new precious stone, the garnet variety "rhodolite" (from *rhodon*, the Greek for rose) in the Cowee Valley, Macon County, North Carolina. He also discovered a number of new mineral varieties, one of which, a form of rutile, he named "edisonite," after Thomas A. Edison[1]; another, a hydrous silicate of thorium and uranium, he named "mackintoshite" after his faithful collaborator, J. B. Mackintosh. In connection with the latter, Hidden also described auerlite, a hydrous phospho-silicate of thorium, named after Dr. Carl Auer von Welsbach, inventor of the Welsbach light; sulphohalite, a chloro-sulfate of sodium; yttrialite, a silicate of the yttrium metals and thorium; thorogummite, a silicate of thorium; and rowlandite, a silicate of yttrium, named after Prof. Henry A. Rowland.

Another mineral described by Hidden, in collaboration with J. B. Mackintosh, was the eudialyte (eucolite) of Magnet Cove, Arkansas; and with Dr. James Hyde Pratt he reported on an occurrence of the rare platinum mineral, sperrylite, near the summit of Mason Mountain, North Carolina, in fissures and cavities of a rock made up essentially of rhodolite and biotite.

Hidden was greatly interested in meteorites, and described the following falls:

Chulafinee; from Clebourne County, Alabama.[2] Found in 1873; weight 14.75 kg. (32.5 pounds). It originally weighed more, but a piece of about 1½ kg. was broken off by a blacksmith who worked the iron into horseshoe nails and a plow point.

Fort Duncan; from Maverick County, Texas. Weighs 43.5 kg. (96 pounds) and is associated with the great meteoric fall in the State of Coahuila, Mexico.

Dalton; from Whitfield County, Georgia.

Hayden Creek; from Lemhi County, Idaho.

[1, 2] See bibliography at the end of the paper.

Joe Wright Mountain; from Independence County, Arkansas.
Laurens County; from Laurens County, South Carolina.
Lick Creek; from Davidson County, North Carolina.
Mazapil; from State of Zacatecas, Mexico.

About 1880, he examined and described the meteorite found in 1877 on a farm some twenty miles northeast of Dalton, Whitfield Co., Ga. As he saw it in the State museum at Atlanta it weighed 4.4 kg. (9.7 pounds), but it is said to have originally weighed 6 kg. He found it to be of the usual composition, with deliquescent chloride of iron in many spots, and he notes that the region where it was discovered, near the Tennessee and North Carolina boundaries, is remarkable for the number of meteorites it has afforded.

One of the principal American meteorites was the famous Mazapil meteoric iron from the State of Zacatecas, Mexico, seen to fall on the night of November 27, 1885, weighing about 4 kg., and believed to have had some connection with Encke's Comet. Hidden's entire collection was purchased by the Imperial Museum of Vienna, where it now is.

Hidden profited by many of his discoveries, exploring and developing each deposit, only to sell out and turn to another. He was the strongest factor in developing North Carolina gem occurrences, the emerald, hiddenite, rutile, quartz, etc. Later, he aided in the opening up of the turquois mines of New Mexico. The development of the Welsbach light led to his search for zircon and monazite deposits in the South Atlantic States, and later the rare minerals in Llano County, Texas.

Early in 1903 he had purchased from the Piedmont Mineral Company, Limited, of London, England, a tract of mineral land in Texas, 24 acres in extent. It is described in the deed as being on the west bank of the Colorado River, in Llano Co., Texas, and the deposits include many of the rare yttrium and erbium ores. The altered variety of zircon, cyrtolite, is also mentioned as being present. In May, 1903, a few months after his purchase, he was able to sell the property to the Nernst Lamp Company, the Trustees of which have since resold the land, reserving the mining and mineral rights. His articles describing his explorations of this deposit, and the remarkable minerals found there, make extremely interesting reading.

Hidden subsequently became interested in the Nipissing Min-

ing Company, and wrote a report on the mines of this company at Cobalt, Canada. He also described the La Rosa mining property at the same place. And still more recently he was connected with the development of a large copper property known as the "Sunshine" in southern California.

PAPERS BY WILLIAM EARL HIDDEN IN AMERICAN JOURNAL OF SCIENCE

In 3d Series, 1871–1895

Meteorite from Cleberne Co., Alabama. **19**, 370, 1880.

New locality of fergusonite. **20**, 150, 1880.[1]

New meteoric iron from North Carolina. **20**, 324, 1880.

Octahedrite, Burke Co., North Carolina. **21**, 160, 1881.

Xenotime, Burke Co., North Carolina. **21**, 244, 1881.

Whitfield Co., Georgia, meteoric iron. **21**, 286, 1881.

Geniculated zircons. **21**, 507, 1881.

North Carolina minerals and localities: **21**, 159, 1881; **22**, 21, 489, 1881; **24**, 372, 1882; **29**, 249, 1885; **32**, 483, 1886.

Fluid-bearing quartz crystals. **25**, 393, 1883.

Herderite, a glucinum-calcium phosphate, from Oxford Co., Maine. **27**, 73; (With J. B. Mackintosh), 135, 1884.

Tourmaline from Maine. **27**, 154, 1884.

Phenacite (from Florissant, Col.). **29**, 249, 1885.

Transparent crystal of microlite. **30**, 82, 1885.

Hanksite from California. **30**, 133, 1885.

Meteorites from Independence Co., Arkansas, and from Laurens Co., South Carolina. **31**, 460, 1886.

Contributions to mineralogy by W. E. Hidden, with crystallographic notes by A. des Cloizeaux. **32**, 204, 1886.

Meteorite from (Maverick Co.), Texas. **32**, 304, 1886.

Mazapil meteorite. **33**, 221, 1887.

(With H. S. Washington) Contributions. **33**, 505, 1887.

Edisonite, a fourth form of titanic acid. **36**, 272, 1888.

(With J. B. Mackintosh) Yttria and thoria minerals from Llano Co., Texas. **38**, 474, 1889.

Eudialyte from Magnet Cove, Arkansas. **38**, 494, 1889. (With S. L. Penfield) Hamlinite. **39**, 511, 1890.

(With Mackintosh) Polycrase of North and South Carolina. **34**, 302, 1890; **41**, 423, 1891. Mineralogical notes. **41**, 438, 1891.

New yttrium silicate (rowlandite). **42**, 430, 1891.

Mackintoshite, a new thorium and uranium mineral with analyses by W. F. Hillebrand. **46**, 98, 1893.

Zoisite, Mitchell Co., North Carolina. **46**, 154, 1893.

(With W. F. Hillebrand) Rowlandite. **46**, 208, 254, 1893.

Notes. **46**, 254, 1893; New localities for turquoise. **46**, 400, 1893.

[1] "Besides other results of my search for platinum in the auriferous gravels of the Southern States, is the discovery in July, 1879, of the mineral *fergusonite* at Brindletown, Burke County, North Carolina."

In 4th Series

(With J. H. Pratt) Rhodolite, Sperrylite, zircon, etc., North Carolina. **5**, 294, 1898; **6**, 323, 381, 463, 1898.
(With Judd) Ruby (at Cowee Creek), North Carolina. **8**, 370, 1899.
Hayden Creek, Lemhi Co., Idaho, Meteorite. **9**, 367, 1900.
Corundum twin (Coler Fork of Cowee Creek, Marion Co.), North Carolina. **13**, 474, 1902.
Results of late mineral research in Llano Co., Texas. **19**, 425, 1905.
Cassiterite, a new cleavage. **20**, 410, 1905.
(With C. H. Warren) Yttrocrasite. **22**, 515, 1906.

In Transactions of the New York Academy of Sciences

Discovery of emeralds in North Carolina. **1**, 101, 1882.
Phenomenal pocket of quartz crystals. **1**, 131, 1882.
Meteorite from Maverick Co., Texas. **5**, 231, 1886.

In Mineralogical Magazine and Journal of the Mineralogical Society (Abstracts)

Herderite in Maine. **5**, 335, 1884.
Edisonite. **9**, p. 38, 1890.
(With Hillebrand) Mackintoshite. **10**, 341, 1894.
(With Hillebrand) Rowlandite. **10**, 338.

PROCEEDINGS OF SOCIETIES

THE PHILADELPHIA MINERALOGICAL SOCIETY

Wagner Free Institute of Science, September 11, 1919

A stated meeting of the Philadelphia Mineralogical Society was held on the above date with the president, Dr. Leffmann, in the chair. Sixteen members and two visitors were present.

The following officers were nominated for 1919–1920: President: Dr. Herman Burgin; Vice-president, Mr. Harry W. Trudell; Treasurer, Mr. Harry A. Warford; Secretary, Mr. Samuel G. Gordon.

Mr. Gordon presented an account, illustrated with slides and specimens, of a mineralogical trip taken thru Pennsylvania during July. Gorman's quarry, East Goshen; General Trimble's mine, near Planebrook; the Chester Co. mine, near Phoenixville; and French Creek mines, in Chester County, were first visited. At Robeson, Berks County, a number of zeolites were obtained, including epidesmine; at Cornwall, Lebanon County: pyrite, chalcopyrite, magnetite, calcite, serpentine, asbestus, chlorite, aragonite, and byssolite; at Kimmel's farm, 3 km. north of New Kingston, Cumberland Co., quartz crystals; at the old wavellite mine, 2½ km. southeast of Moore's Mill, Cumberland County: wavellite, beraunite, cacoxenite, and strengite, in very attractive specimens. This mine has been abandoned for 10 years, and no good crystals of wavellite were obtained. Another old wavellite mine at Ross farm, just west of the Tuscarora River, 8 km. south of Blairs Mills in Huntington Co. (and 60 km. northwest of the previous mine) was visited, but no specimens were found, as the mine has been abandoned for over 20 years

and is pretty well overgrown. No specimens are obtainable at the Dry Hollow mines near Warriors Mark in Huntington Co.

The next group of localities visited were in the coal district along the Mahanoy valley, from Shamokin to Mauch Chunk. At Mahanoy City Colliery pyrite and pyrophyllite were found. Permission was secured to visit the No. 1 Tunnel at Nesquehoning, where lansfordite and nesquehonite were found in 1887; the former at present being only represented in a few collections by pseudomorphs. This tunnel is about 5 km. long, and was slowly examined from an electric car. About 600 meters from the mouth, the two minerals were discovered, covering a patch about 3 meters square on the roof of the tunnel, and down one wall, adjacent to the "Fifty-foot vein." Colorless stalactites of lansfordite up to 8 cm. in length were obtained, showing the characteristic combination of stalactite with crystal faces at the termination. In four days, however, all the stalactites turned to opaque chalk-white nesquehonite, cryptocrystalline on the surface, but coarsely crystalline within. About 50 stalactites were collected. Large masses (15 x 20 cm.) of radiating nesquehonite were obtained on the wall, coated with crystals of lansfordite (since altered) in front, and exhibiting solid radiations on the back, with individual needles 4 cm. long.

At the trolley cut at the eastern base of Mt. Pisgah, 1 km. north of Mauch Chunk, carnotite is obtainable in abundance; glauberite molds were found near Steinsburg, Bucks Co., and glaucophane between Limeport and Coopersburg, Lehigh Co.

Mr. Trudell reported in detail the August 30 to September 1 Excursion to Robeson, Berks Co., and Cornwall, Lebanon Co., attended by Messrs. Hagey, Knabe, Frankenfield, Warford, Gordon, and Trudell. Specimens and lantern slides were shown. Mr. Hagey exhibited micro-mounts from Cornwall with a Greenough binocular. Mr. Gordon reported a trip to Avondale and Leiperville, with Dr. Hawkins and Mr. Ford, finding very good garnets.

Samuel G. Gordon, *Secretary.*

NEW MINERALS

Cocinerite

George J. Hough: Notes on an unlisted mineral, *Am. J. Sci.* [4], **48** (3), 206, 1919.

Name: from the locality.

Physical properties

Color: silver gray, slowly tarnishing black; streak: lead gray; luster: metallic; massive, homogeneous under the microscope; sp. gr. = 6.14; H. = 2.5.

Chemical properties

Compn.: Cu_4AgS. Analysis gave: Cu 60.58, Ag 27.54, Fe 1.55, S 9.65%.

Occurrence

At the Cocinera mine, Ramos, San Luis Potosi, Mexico; in the oxidized zone, at a depth of 330 meters, associated with copper, silver, malachite, azurite, cuprite and melaconite.

S. G. G.

ABSTRACTS OF MINERALOGIC LITERATURE

CRYSTALLOGRAPHIC STUDIES OF BARITE. H. P. WHITLOCK. *14th Rept. Dir. N. Y. State Mus.* 1917 (*Bull.* **207**), 157–164, 1919.

Barite from Five Islands, N. S. gave the new forms: j_3 (053), ψ_2 (165), and ψ_3 (167); from McCormick, S. C. Σ_3 (510), *F* (380), and λ_5 (215). Crystals are also described from Black Cape, Quebec. S. G. G.

ANGLESITE FROM THE COEUR D'ALENE DISTRICT, IDAHO. E. V. SHANNON. *Am. J. Sci.* [4], **47** (4), 287–292, 1919.

Anglesite has been found in four mines in the district, as compact massive ash-gray coatings on galena; prismatic crystals elongated parallel to *b* up to 5 cm. long, and in transparent colorless prismatic crystals resembling and equalling in beauty those from Monte Poni. "It is doubtful whether any locality in the United States has equalled this mine in the size and beauty of its crystals." Nineteen forms were observed, two of which were new: (910) and (0.1.14), represented by very narrow line faces.

[Colorless crystals 15 cm. long and weighing over 200 g. were found at the Wheatley Mines, near Phoenixville, Pa. during the operation of these mines. Abstr.] S. G. G.

AN APPARATUS FOR GROWING CRYSTALS UNDER CONTROLLED CONDITIONS. J. C. HOSTETTER. *J. Wash. Acad. Sci.*, **9** (4), 85–94, 1919.

A HERETOFORE UNDESCRIBED METEORIC STONE FROM KANSAS CITY, MISSOURI. GEORGE P. MERRILL. *Proc. U. S. Nat. Mus.*, **55**, 95–96, 1919.

The stone was found in 1903 about 2 m. below the surface, in a stone quarry, having penetrated 1 m. of dirt and soil, and 8 dm. of shaly limestone. The stone is a crystalline spherulitic chondrite composed essentially of olivine and enstatite. The stone weighed 34,500 grams; allowing 1,500 grams thru lost fragments due to breaking and exfoliation, gives an approximate original weight of 36 kilograms. S. G. G.

THE CUMBERLAND FALLS METEORITE. ARTHUR M. MILLER. *Science*, **49** (1275), 541–542 (June 6), 1919.

An account of the phenomena attending the fall of a meteoritic stone near Sawyer P. O., Falls of the Cumberland, Kentucky, on April 9, 1919. Seven pieces ranging in weight from 350 g. to 2.5 kg. of one mass, and 52 pieces weighing from 20 g. to 2 kg. of a mass originally weighing 15 kg. have been found. S. G. G.

THE CUMBERLAND FALLS METEORITE. GEORGE P. MERRILL. *Science*, **50** (1282), 90, 1919.

The stone is a coarse enstatite breccia, closely compacted, showing evidences of compression and other indications of having been a portion of a body of considerable size. The metorite carries enclosures of a dark, nearly black, chondritic stone, sometimes 4 or 5 cm. in diameter. The name *whitleyite* is proposed for achondrites of this type. S. G. G.

CRYSTALLOLUMINESCENCE. H. B. Weiser. *J. Phys. Chem.*, **22**, 480–509, 576–595, 1918.

A study of the emission of light on crystallization and on crushing crystalline substances. In both cases the light is believed to be emitted in connection with the formation of molecules from ions. E. T. W.

TYPES OF PHOSPHORESCENCE. Edward L. Nichols and H. L. Howes. *Proc. Nat. Acad. Sci.*, **4**, 305–312, 1918.

The spectra of phosphorescent light under various conditions are described, and the theory of the subject discussed. Franklin Furnace calcite and other minerals are considered. E. T. W.

STRUCTURE OF CRYSTALS IN EXTREMELY THIN PLATES; A NEW EXPERIMENTAL DETERMINATION OF MOLECULAR MAGNITUDE. Rene Marcelin. *Ann. phys.*, **10**, 189–194, 1918.

Sheets of mica of extreme thinness were made by pressing a piece against a bit of melted selenium, allowing to cool, and pulling apart. These were examined in the metallographic microscope, and their thickness determined with a quartz wedge, using a Michel-Levy comparator. The differences in thickness between different parts of a given sheet were found to be multiples of 0.70 $\mu\mu$, which is to be regarded as the thickness of a mica molecule; this value agrees with theory. Similar results were obtained with certain artificial chemical compounds. E. T. W.

THE ORIENTATION OF ANISOTROPIC LIQUIDS IN CONTACT WITH CRYSTALS. II. F. Grandjean. *Bull. soc. franc. min.*, **40**, 69–105, 1917.

Several new anisotropic liquids were studied on cleavage surfaces of orpiment, sphalerite, phlogopite, brucite, talc, pyrophyllite, muscovite, halite sylvite and leadhillite. Definite forces are found to exist, acting between the molecules at the surface of the crystal and those of the anisotropic liquid.

E. T. W.

RADIOACTIVITY OF ITALIAN MINERALS. L. Francesconi, and others. *Gazz. chim. ital.*, **48**, i, 112–113, 1918; thru *Chem. Abstr.*, **13** (8), 811, 1919.

A number of minerals have been examined and pyromorphite, wulfenite, and chrysocolla, also certain minerals of tungsten and manganese, found to be radioactive. Malachite from Chile and galena from Argentine also showed this property. E. T. W.

THE ATOMIC STRUCTURE OF CARBORUNDUM DETERMINED BY X-RAYS. C. L. Burdick and E. A. Owen. *J. Am. Chem. Soc.*, **40**, 1749–1759, 1918.

Carborundum crystals were examined with X-rays from a lead target by the Bragg method. The silicon and carbon atoms prove to lie in interpenetrating face-centered rhombohedral space-lattices, displaced slightly along the *c*-axis. This structure is similar to that of diamond. The distance between layers of atoms in the basal plane is 2.179×10^{-8} cm. [The structure deduced is apparently hemimorphic, indicating that this substance belongs to the trigonal-hemimorphic class. Abstr.] E. T. W.

PLATE 16.

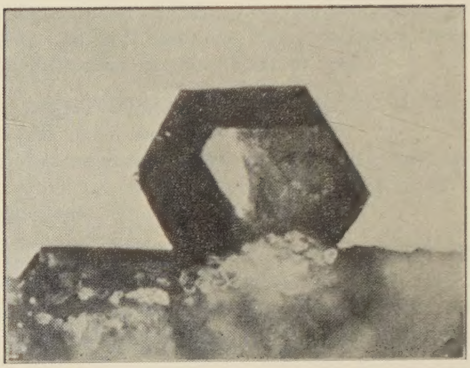

FIG. 1. PYRRHOTITE. MAGNIFIED 19 DIAMETERS.

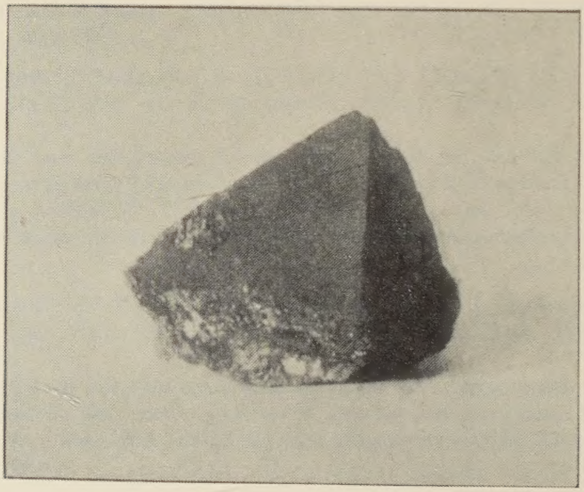

FIG. 2. MAGNETITE. $\frac{5}{6}$ SIZE.

NEW YORK CITY MINERALS.

From "The Minerals of Broadway," Bull. 3, N. Y. Mineralogical Club.